

# Supplementary Information: Tree height, microhabitat, and hydraulic traits shape drought responses in a temperate broadleaf forest

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## Supplementary Information

Table S1: Species-specific bark thickness regression equations

Species	Equations	r.2
Carya cordiformis	$\ln[B] = -1.56 + 0.416 \cdot \ln[DBH]$	0.226
Carya glabra	$\ln[B] = -0.393 + 0.268 \cdot \ln[DBH]$	0.040
Carya ovalis	$\ln[B] = -2.18 + 0.651 \cdot \ln[DBH]$	0.389
Carya tomentosa	$\ln[B] = -0.477 + 0.301 \cdot \ln[DBH]$	0.297
Fagus grandifolia	$\ln[B] = 1 \cdot \ln[DBH]$	NA
Fraxinus americana	$\ln[B] = 0.418 + 0.268 \cdot \ln[DBH]$	0.256
Juglans nigra	$\ln[B] = 0.346 + 0.279 \cdot \ln[DBH]$	0.246
Liriodendron tulipifera	$\ln[B] = -1.14 + 0.463 \cdot \ln[DBH]$	0.545
Quercus alba	$\ln[B] = -2.09 + 0.637 \cdot \ln[DBH]$	0.603
Quercus prinus	$\ln[B] = -1.31 + 0.528 \cdot \ln[DBH]$	0.577
Quercus rubra	$\ln[B] = -0.593 + 0.292 \cdot \ln[DBH]$	0.087

Table S2: Species-specific height regression equations

Species	Equations	r.2
Carya cordiformis	$\ln[H] = 0.391 + 0.805 \cdot \ln[DBH]$	0.899
Carya glabra	$\ln[H] = 0.654 + 0.728 \cdot \ln[DBH]$	0.890
Carya ovalis	$\ln[H] = 0.939 + 0.641 \cdot \ln[DBH]$	0.922
Carya tomentosa	$\ln[H] = 0.851 + 0.682 \cdot \ln[DBH]$	0.890
Fagus grandifolia	$\ln[H] = 0.574 + 0.713 \cdot \ln[DBH]$	0.887
Liriodendron tulipifera	$\ln[H] = 1.21 + 0.559 \cdot \ln[DBH]$	0.760
Quercus alba	$\ln[H] = 2.07 + 0.318 \cdot \ln[DBH]$	0.523
Quercus prinus	$\ln[H] = 0.594 + 0.713 \cdot \ln[DBH]$	0.799
Quercus rubra	$\ln[H] = 1.42 + 0.473 \cdot \ln[DBH]$	0.832
all	$\ln[H] = 0.946 + 0.621 \cdot \ln[DBH]$	0.868

Table S3: Palmer drought severity index (PDSI) by month for focal droughts and other years referenced in the manuscript

	year	month	PDSI	rank
<b>focal droughts</b>				
	1966	May	-2.98	2
	NA	June	-3.40	2
	NA	July	-4.08	2
	NA	August	-4.82	1
	1977	May	-2.96	3
	NA	June	-3.28	3
	NA	July	-3.61	3
	NA	August	-3.68	3
	1999	May	-3.63	1
	NA	June	-4.21	1
	NA	July	-4.53	1
	NA	August	-4.64	2
<b>others</b>				
	1964	May	-1.08	20
	NA	June	-1.97	11
	NA	July	-2.46	8
	NA	August	-2.98	5
	1991	May	-1.79	10
	NA	June	-2.10	10
	NA	July	-2.17	10
	NA	August	-3.06	4
	2007	May	-1.37	16
	NA	June	-1.59	16
	NA	July	-2.40	9
	NA	August	-2.55	11

Table S4: Candidate variables for best model

prediction	variable	variable_description	top_model
1.2	position_all	crown position with H	1999
2.2	height.ln.m	ln[H]	all
2.2	height.ln.m	ln[H]	1966
2.3	position_all	crown position alone	1966
2.4	TWI.ln	ln[TWI]	all
2.4	TWI.ln	ln[TWI]	1977
2.4	TWI.ln	ln[TWI]	1999
3.1	rp	ring porosity	1999
3.2	PLA_dry_percent	PLA	all
3.2	PLA_dry_percent	PLA	1966
3.4	mean_TLP_Mpa	TLP	all
3.4	mean_TLP_Mpa	TLP	1977

Table S5. Correlation of species' traits with tree height across all individuals in the ForestGEO plot

variable	model	coefficient	p-value
WD	WD~ln[H]	-0.16	0
LMA	LMA~ln[H]	7.86	0
ring porosity	ring porosity~ln[H]	0.34	0
PLA	PLA~ln[H]	1.37	0
TLP	PLA~ln[H]	0.13	0

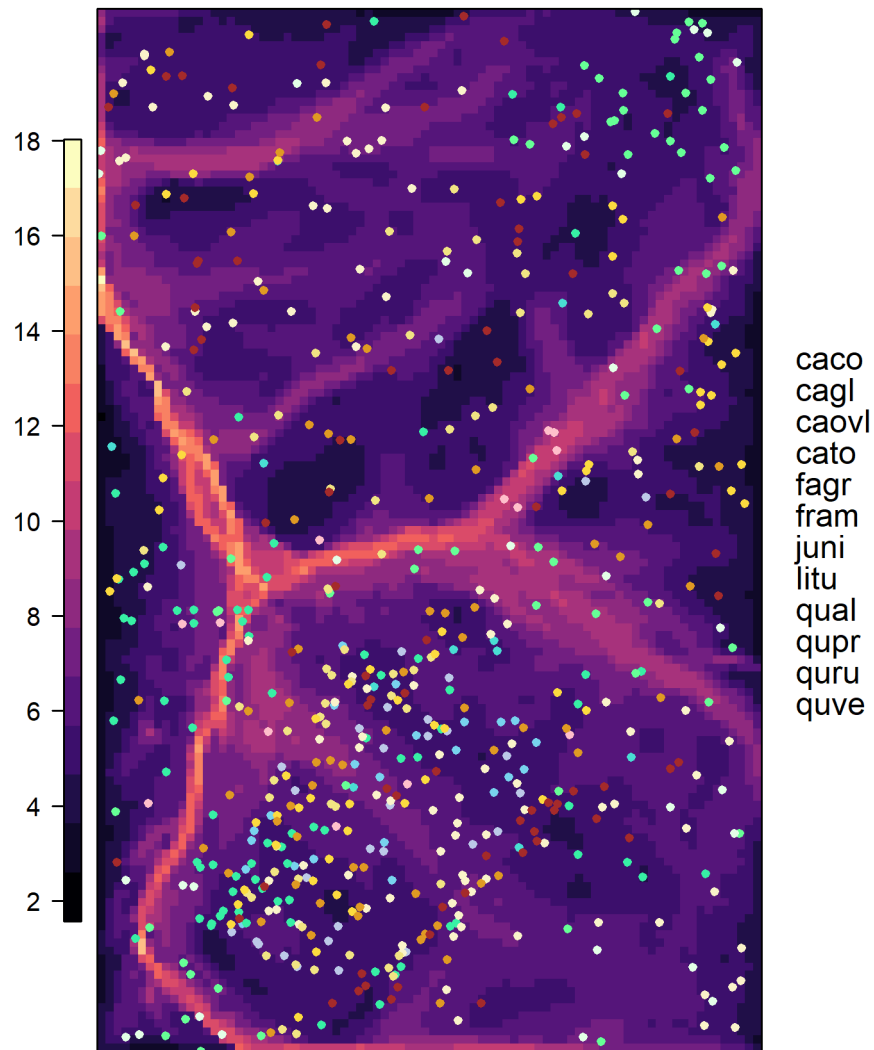


Figure S1: Map of ForestGEO plot showing TWI and location of cored trees

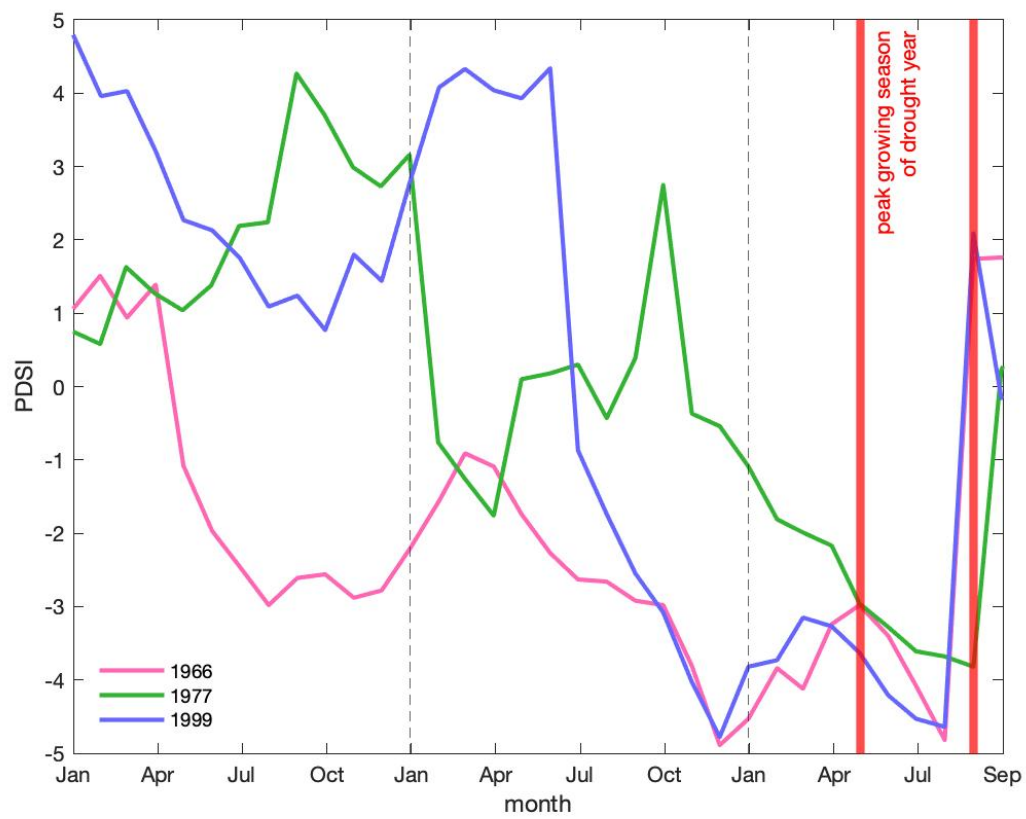


Figure S2: Time series of Palmer Drought Severity Index (PDSI) for the 2.5 years prior to each focal drought